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(54) Title: OPAQUE CONDITIONING COMPOSITION

(57) Abstract

The present invention relates to an opaque conditioner which comprises a monoalkyl quat from C16 to higher Carbon chain lengths (preferably C16 to C22) and a dialkyl quat from C16 to higher Carbon chain lengths (preferably C16 to C18). Also included is an amount of fatty alcohol necessary to opacify the conditioner. The monoalkyl quat is necessary in a ratio to the dialkyl quat of about not less than 2:1. The fatty alcohol is present in an amount from about 1 % to about 4 %.

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WO 00/07562

PCT/EP99/05481

- 1 -

OPAQUE CONDITIONING COMPOSITIONBACKGROUND OF THE INVENTION

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Most individuals buy and use a hair shampoo for its cleansing properties. In addition to having clean hair, a consumer also desires sufficiently-conditioned hair that holds a preset configuration. However, hair shampoos generally are formulated with highly effective anionic surfactants that primarily clean as opposed to conditioning in the hair. Anionic surfactants not only remove the dirt and soil from the hair, but also remove sebum naturally present on the surface of the hair fibers. Therefore, the desirable cleansing properties of anionic surfactants also leave the hair in a cosmetically-unsatisfactory condition. Shampoos also do not detangle wet hair and do not impart residual conditioning benefits to dry hair, such as manageability or styleability of hair sets.

20

In general, shampoo compositions containing anionic surfactants, or nonionic surfactants or amphoteric surfactants, leave hair with an undesirable harsh, dull and dry touch, or feel, usually called "creak", after the hair is shampooed and then rinsed with water. Furthermore, thoroughly cleansed hair also is extremely difficult to comb, in either the wet or the dry state, because the individual hair fibers tend to snarl, kink, and interlock with each other. In addition, incompletely dried hair, such as hair dried with a towel, has poor brushing properties, and after complete drying, the hair does not set well. The

WO 00/07562

PCT/EP99/05481

- 2 -

combing or brushing property of dry hair remains poor, and the hair has undesirable electrostatic properties in a low humidity atmosphere that causes the hair to "fly away", thereby further reducing the brushing properties of the
5 hair.

The unsatisfactory combing or brushing property of hair immediately after shampooing, or during trimming treatments after shampooing, also causes hair damage, such as split
10 ends or hair breakage. In addition, the natural luster and resiliency of the hair is reduced. The overall unsatisfactory condition of shampooed hair often necessitates a subsequent post-shampoo treatment of the hair with a conditioning composition to improve these undesirable
15 physical characteristics. Conditioning compositions typically are applied separately from the hair shampoo, and usually are rinses, cream-like emulsions or lotions containing a cationic compound.

20 Therefore, consumer needs traditionally have been met by the application of a shampoo to cleanse the hair, followed by the application of a conditioner composition to improve wet combing. The commonly accepted method has been to shampoo the hair, followed by rinsing the hair, and then separately
25 applying a conditioner composition, followed by a second rinse. The wet combing problem has been solved by treating shampooed hair with a conditioner composition that coats the hair shaft and causes the individual hair shafts in a tress to resist tangling and matting because of the conditioner
30 residue retained on the shaft.

WO 00/07562

PCT/EP99/05481

- 3 -

However, the need for improved compositions that condition the hair, i.e., render the hair more manageable, has long been recognized in the art. As previously discussed, it is well-known that anionic surfactants are suitable for hair 5 shampooing, and that cationic compounds, like cationic surfactants and cationic polymers, are useful as hair conditioners. Therefore, cationic compounds that are substantive to hair often are used to complete the hair cleansing and hair conditioning cycle.

10

The ability of cationic compounds to adsorb to or interact with the keratinous material of the hair makes these compounds desirable for improving wet hair detangling and dry hair manageability. However, cationic compounds that 15 adsorb particularly strongly to the hair also can reduce the elasticity, body and set of the dried hair. Therefore, although conditioning compositions for application to freshly shampooed hair are well known, new and improved conditioning formulations based on cationic compounds are 20 continually sought.

The following is a list of patents in this field:

JP 56169617 A

JP 56169615 A

JP 87008088 B

JP 56169614 A

JP 87008087 B

JP 56169613 A

JP 87008086 B

WO 00/07562

PCT/EP99/05481

- 4 -

and U.S. Patent No. 4,976,956.

The present invention is directed to a new opaque conditioning composition that is esthetically acceptable to consumers, improves the wet combing and dry combing properties of hair, and also leaves the dry hair with satisfactory cosmetic and physical properties, including, in particular, dry combing and feel, less hair coating, manageability, body, condition of the ends and set.

10

SUMMARY OF THE INVENTION

The invention is an opaque conditioner that has a combination of two different types of conditioning agents and an emulsifier. The present invention is a low solids formulation that provides substantial conditioning benefit without compromising viscosity to users who use conditioners.

20 The purpose of the invention is to provide a conditioner with improved performance, while using effective materials at ratios that optimize their benefit.

25 The present invention relates to an opaque conditioner which comprises a monoalkyl quat from C16 to higher Carbon chain lengths (preferably C16 to C22) and a dialkyl quat each alkyl of which is independently from C16 to C18. Also included is an amount of fatty alcohol necessary to opacify the conditioner. The monoalkyl quat is necessary in a ratio 30 to the dialkyl quat of about not less than 2:1. The fatty alcohol is present in an amount from about 1% to about 4%.

WO 00/07562

PCT/EP99/05481

- 5 -

Another aspect of the invention is to provide a method of treating the hair to yield well-conditioned hair having esthetically pleasing physical properties by contacting the hair with an opaque conditioner of the present invention.

5

DETAILED DESCRIPTION OF THE INVENTION

Unless indicated otherwise, as used herein, % means weight %.

10

The present invention relates to an opaque conditioner which comprises a monoalkyl quat from C16 to higher Carbon chain lengths (preferably C16 to C22) and a dialkyl quat from C16 to C18. Also included is an amount of fatty alcohol necessary to opacify the conditioner. The monoalkyl quat is necessary in a ratio to the dialkyl quat of about not less than 2:1. The ratio of monoalkyl quat to dialkyl quat can range from about 2:1 to about 5:1; or from about 2:1 to about 10:1; or from about 2:1 to about 20:1. Fatty alcohol is present in an amount from about 1% to about 4%.

Monoalkyl quats can be compounds of the formula $N^+R^1R^2R^3R^4 X^-$ wherein R^1 , R^2 , and R^3 are C1-C3 alkyl groups and R^4 is a C16 or greater alkyl group; and X^- is chloride, bromide, methosulfate, ethosulfate, nitrate or tosylate.

Non-limiting examples of monoalkyl quats are:

cetyltrimethylammonium chloride (C16);
30 stearyltrimethylammonium chloride (C18);
 behenetrimethylammonium chloride (C22);

WO 00/07562

PCT/EP99/05481

- 6 -

cetrimonium bromide (C16);
soytrimonium chloride (C18);
tallowtrimonium chloride (C18);
behentrimethylammonium methosulfate (C22);
5 Peg-2 Olealmonium chloride (C18);
palmityltrimethylammonium chloride (C16);
hydrogenated tallowtrimethylammonium chloride (C18);
hydrogenated tallowtrimethylammonium bromide (C18);
hydrogenated tallowtrimethylammonium methosulfate
10 (C18);
cetrimonium tosylate (C16): and
eicosyltrimethylammonium chloride (C20),

Dialkyl quats can be compounds of the formula $N^+R^5R^6R^7R^8 X^-$
15 wherein R^5 and R^6 are C1-C3 alkyl groups and R^7 and R^8 are
C16-C18 alkyl groups; and X^- is chloride, bromide,
methosulfate, ethosulfate, nitrate, acetate, phosphate; or
tosylate.

20 Non-limiting examples of dialkyl quats are:

dicetyltrimethylammonium chloride (C16);
distearyltrimethylammonium chloride (C18);
dipalmityltrimethylammonium chloride (C16);
25 dihydrogenatedtallowdimethylammonium chloride (C18);
ditallowdimethylammonium chloride (C18)
dihydrogenatedtallowdimethylammonium bromide (C18)
dihydrogenatedtallowdimethylammonium methosulfate (C18)

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WO 00/07562

PCT/EP99/05481

- 7 -

The following are non-limiting examples of fatty alcohols which may be used in the compositions of the invention:

- cetyl alcohol;
- 5 stearyl alcohol;
- cetearyl alcohol;
- behenyl alcohol; and
- arachidyl alcohol.

10 Optional ingredients which may be included in the compositions of the invention are hydrocarbons such as paraffin, vaseline solid paraffin, squalene, oligomer olefins and the like; amidoamines such as stearamidoethyl dimethylamine, isostearamidoethyl morpholine,

15 behenamidoethyl dimethylamine and the like; humectants such as glycerine, propylene glycol, glycerol, sorbitol and the like; esters, such as isopropyl palmitate, isopropyl myristate, and stearyl stearate and the like; emulsifiers such as glyceryl monostearate, sorbitan monopalmitate,

20 polyoxyethylene stearate and the like; cellulose derivatives such as hydroxypropylcellulose; cationic cellulose, hydroxyethyl cellulose and the like; thickening agents such as natural polymers and the like; and other ingredients such as solvents, bacteriacides, colors, and fragrances.

25 Compositions of the invention may be prepared by methods which are known to those skilled in the art. Ingredients used in the preparation of compositions of the invention are either known or may be prepared by known methods.

WO 00/07562

PCT/EP99/05481

- 8 -

Compositions of the invention are used to condition hair by first wetting the hair, applying the composition of the invention, lathering the hair, and then rinsing the hair.

Alternatively, water and conditioner may be applied to the 5 hair simultaneously. Conditioning with compositions may be done right after shampooing when the hair is still wet. Alternatively, conditioning the hair may be done separately from shampooing.

10 Compositions of the invention provide unexpectedly superior conditioning benefits when compared with prior art formulations. Compositions of the invention provide unexpectedly provide a high, consumer acceptable viscosity using relatively low levels of monoalkyl quat, dialkyl quat, 15 and fatty alcohol.

Finally, compositions of the invention provide unexpectedly superior conditioning without the use of increased fatty alcohols.

20 To demonstrate the new and unexpected results achieved by the present invention, the following compositions were prepared.

25 Compositions of the present invention have significantly more conditioning versus a formulation with ingredients that fall outside of the ratios set by the present invention. The following chart illustrates.

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WO 00/07562

PCT/EP99/05481

- 9 -

A.) Conditioning Performance

Instron Wet Combing Test

Ingredients	Composition (A) Prior Art	Composition (B)	Composition (C)
Natrosol 250HHR, 97% active	.30	-	-
Cetrimonium Chloride, 30% active	1.2	2.15	2.8
Isopropyl Palmitate, 100% active	.5	-	-
Distearyldimonium Chloride, 95% active	1.1	.20	.1
Stearyl Alcohol, 100% active	-	.50	-
Cetearyl Alcohol, 100% active	1.9	2.5	-
Cetyl Alcohol, 100% active	-	-	3.0
Other ¹	q.s.	q.s.	q.s.
Combing Force (gm force)	14.1	10.0A	7.9AB

5 Other¹ - soft water, fragrance, preservatives, and other minor ingredients.

WO 00/07562

PCT/EP99/05481

- 10 -

The combing force shows that:

Composition (C), with a monoalkyl:dialkyl ratio of 8.8:1 is significantly better than Composition (B), with a

5 monoalkyl:dialkyl ratio of 3.4:1. Composition (C) with a mono:dialkyl ratio of 8.8:1 is significantly better than that Composition (A) with a monoalkyl:dialkyl ratio of .345:1. Composition

10 (B), with a monoalkyl:dialkyl ratio of 3.4:1 is significantly better than Composition

(A) with a monoalkyl:dialkyl ratio of .345:1.

The following chart summarizes consumer preference for a

15 composition of the invention as opposed to a composition of the prior art.

WO 00/07562

PCT/EP99/05481

- 11 -

Ingredients	Composition (A) Prior Art	Composition (D)
Natrosol 250HHR, 97% active	.30	-
Cetrimonium Chloride, 30% active	1.2	2.8
Isopropyl Palmitate, 100% active	.50	-
Distearyl Dimonium Chloride, 95% active	1.1	.15
Cetearyl Alcohol, 100% active	1.9	-
Cetyl Alcohol, 100% active	-	3.0
Other ²	q.s.	q.s.
Conditions your hair	16	40A
Adds moisture to your hair	14	32A
Gives your hair body	16	32A
Leaves hair easy to comb wet	14	30A
Leaves hair easy to comb dry	8	22A
Consistency	9	23A

Other² - soft water, fragrance, preservatives, and other minor ingredients.

5

This chart shows that consistent with the Instron Study consumers rate the Invention, composition (D) as a better wet combing conditioner as well as rating the invention higher on many key conditioning attributes. Composition (D)

10 with a monoalkyl:dialkyl ratio of 5.9:1 is significantly

WO 00/07562

PCT/EP99/05481

- 12 -

preferred over Composition (A) with a monoalkyl: dialkyl ratio of .345:1.

The consumer ratings given just above mean the following: A 5 letter next to a rating signifies that the product measured is significantly different than the product designated by the letter at a 90% C.I.

10

Evaluation of 2:1 versus 1:1 mono:dialkyl quat ratio

Ingredients	Composition (E)	Composition (F)
Cetrimonium Chloride, 30% active	2.22	1.7
Distearyldimonium Chloride, 95% active	.33	.50
Cetyl Alcohol, 100% active	3.0	3.0
Other ³		
Ratio mono:di	2:1	1:1
Salon blitz consumer evaluations		
Like conditioning	6.58	5.75
Like fullness/volume	6.58F	5.25
Like bounce	6.58F	5.17
Ease of combing wet	8.33	7.50
Ease of combing dry	8.42	7.42
Moisturized	7.25F	6.00
Fullness	6.00F	4.58

WO 00/07562

PCT/EP99/05481

- 13 -

Other³ - soft water, fragrance, preservatives, and other minor ingredients.

Consumers evaluated products and filled out a questionnaire 5 regarding their responses to the product. There were approximately 15 consumers for each product. A letter next to a rating signifies that the product measured is significantly different than the product designated by the letter at a 90% C.I. From the above table it can be seen 10 that a product with a 2:1 mono:dialkyl quat ratio was significantly better in the salon blitz evaluations than a product with a 1:1 mono:dialkyl quat ratio.

B.) Viscosity
15 An acceptable and preferred viscosity is achieved by optimizing the levels of the three ingredients, monoalkyl quat, dialkyl quat and fatty alcohol. Small levels of the dialkyl quat give a significant increase in viscosity, thus 20 allowing a lower level of fatty alcohol. (When fatty alcohol is at higher levels it can affect the performance of the quats.) The fatty alcohol can be as low as 1 or 2% as long as there is a small presence of the dialkyl quat. However 25 without the dialkyl quat, 1 or 2% fatty alcohol results in an unacceptable viscosity. The following charts illustrate this.

WO 00/07562

PCT/EP99/05481

- 14 -

Effect of Dialkyl quat on low fatty alcohol systems

Ingredients	Compo- sition (G)	Compo- sition (H)	Compo- sition (I)	Compo- sition (J)	Compo- sition (D)
Cetrimonium Chloride, 30% active	2.8	2.8	2.8	2.8	2.8
Distearyldimonium Chloride, 95% active	-	-	.15	-	.15
Cetyl Alcohol, 100% active	1.0	2.0	2.0	3.0	3.0
Other ⁴	q.s.	q.s.	q.s.	q.s.	q.s.
Viscosity TA/.5. RV 4/20 @ 7 days room temperature (cps)	8k, 470	46k, 2200	116k, 6400	74k, 4600	128k, 6600

Other⁴ - soft water, fragrance, preservatives, and other
5 minor ingredients.

The above chart shows that the addition of even a small
amount of the Dialkyl quat, .15%, results in a significant
increase in viscosity. The following chart illustrates that
10 increasing the fatty alcohol without dialkyl quat will not
give you substantially more viscosity. Viscosity TA/.5. and
RV 4/20 @ 7 days are Brookfield measures of viscosity.
TA/.5. is a low shear measure with TA spindle at .5 rpm.
RV 4/20 is a high shear measure which uses the RV/4 spindle
15 at 20 rpm.

WO 00/07562

PCT/EP99/05481

- 15 -

Effect of Increased fatty alcohol on systems with no Dialkylquat.

Ingredients	Composition (H)	Composition (J)	Composition (K)	Composition (L)	Composition (D)
Cetrimonium Chloride, 30% active	2.8	2.8	2.8	2.8	2.8
Distearyldimonium Chloride, 95% active	-	-	-	-	.15
Cetyl Alcohol, 100% active	2.0	3.0	4.0	5.0	3.0
Other ⁵	q.s.	q.s.	q.s.	q.s.	q.s.
Viscosity TA/.5. RV 4/20 @ 7 days	46k, 2200	74k, 4600	76k, 4900	78k, 5000	128k, 6600

5 Other⁵ - soft water, fragrance, preservatives, and other minor ingredients.

Composition (D) with only 3% fatty alcohol is significantly more viscous than Composition (K) or Composition (L) with 10 higher levels of fatty alcohol. Other monoalkyl quats such as Behentrimonium Chloride and other Dialkylquats such as Dicetyldimonium Chloride are also effective. The following chart illustrates this.

WO 00/07562

PCT/EP99/05481

- 16 -

Effect of other quats

Ingredients	Composition (M)	Composition (N)
Behentrimonium Chloride, 80% active	1.05	1.05
Distearyldimonium Chloride, 95% active	.15	-
Cetyl Alcohol, 100% active	3.0	3.0
Other ⁶	q.s.	q.s.
Viscosity TA/.5. RV 4/20 @ 7 days (cps)	90k, 5400	62k, 3400

Other⁶ - soft water, fragrance, preservatives, and other 5 minor ingredients.

The dialkyl quat also enhances the viscosity when Behentrimonium Chloride is used in place of Cetrimonium Chloride.

WO 00/07562

PCT/EP99/05481

- 17 -

C.) Deposition

Fatty Alcohol and Quat Deposition

Ingredients	Composition (D)	Composition (J)
Cetrimonium Chloride, 30% active	2.8	2.8
Distearyldimonium Chloride, 95% active	.15	-
Cetyl Alcohol, 100% active	3.0	3.0
Other ⁷	q.s.	q.s.
Fatty alcohol deposition (ug/g of hair +/- 10%)	450	305
Cetrimonium Chloride deposition (ppm of hair, values are +/- 25%)	100	50
Distearyldimonium Chloride deposition (ppm of hair, values are +/- 25%)	10	not detected

5

Other⁷ - soft water, fragrance, preservatives, and other minor ingredients.

Duplicate tresses were extracted twice with 50ml portions of 10 chloroform. The extracts were combined and concentrated. Fatty alcohols were measured by GC-MS relative to an internal standard and measured relative response factors were used. Quats were measured on 1:100 dilutions by electrospray LC-MS.

WO 00/07562

PCT/EP99/05481

- 18 -

Sample (D), which in addition to its monoalkyl quat has a small amount of dialkyl quat, surprisingly and unexpectedly deposited more fatty alcohols and quats on the tresses than did sample (J) which lacked dialkyl quat. The use of 5 monoalkyl quat in combination with dialkyl quat surprisingly and unexpectedly increases the deposition of fatty alcohols and quats on hair and thus increases the hair conditioning benefits of compositions of the invention.

10 D.) Phase Behavior

Conditioners are believed to perform best when they are formulated in the liquid crystalline phase. Dialkyl quats are generally thought to be in the liquid crystalline phase. 15 We have found that monoalkyl quats, such as, Cetyl Trimethylammonium Chloride (CTAC) need increased amounts of fatty alcohol to move the CTAC in the liquid crystalline phase. It is believed that the present invention does not use increased amounts of fatty alcohol to achieve a 20 conditioner in the liquid crystalline phase

WO 00/07562

PCT/EP99/05481

- 19 -

CLAIMS

1. An opaque hair conditioning composition comprising:

5 (a) a monoalkyl quat having 16 or greater carbon atoms in an alkyl substituent;

(b) a dialkyl quat having 16 to 18 carbon atoms in each alkyl substituent and

10 (c) a fatty alcohol in an amount sufficient to opacify said composition;

wherein the ratio of (a) to (b) is at least 2:1.

15 2. A composition according to claim 1 wherein the ratio of (a) to (b) is about 2:1 to about 20:1.

20 3. A composition according to claim 2 wherein the ratio of (a) to (b) is about 2:1 to about 10:1.

4. A composition according to claim 3 wherein the ratio of (a) to (b) is about 2:1 to about 5:1.

25 5. A composition in accordance with claim 1 wherein said fatty alcohol is present at about 1 to about 4%.

6. A composition in accordance with claim 1 wherein said monoalkyl quat is selected from the group consisting of 30 behentrimonium chloride and cetrimonium chloride.

WO 00/07562

PCT/EP99/05481

- 20 -

7. A composition in accordance with claim 1 wherein said dialkyl quat is selected from the group consisting of dicetyltrimonium chloride and distearyltrimonium chloride.

5 8. A composition in accordance with claim 1 wherein said monoalkyl quat is cetrimonium chloride.

9. A composition in accordance with claim 1 wherein said dialkyl quat is distearyltrimonium chloride.

10

10. A composition in accordance with claim 1 wherein said fatty alcohol is cetyl alcohol.

11. A method for conditioning hair which comprises

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contacting hair with a composition of claim 1.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 99/05481

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61K7/50

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 211 192 A (L'OREAL) 28 June 1989 (1989-06-28) claims 1,16,18 example 2 ---	1-5,7,9, 11
X	DE 44 25 096 A (KAO) 26 January 1995 (1995-01-26) claim 1 page 4, line 55 -page 5, line 12 example 3 ---	1-4,6-9, 11
X	DE 195 38 094 C (KAO) 20 February 1997 (1997-02-20) page 2, line 40-63 page 4 ---	1-8,10, 11

Further documents are listed in the continuation of box C.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 99/05481

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